```
SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSSS  LLL                     000000000       AAAAAAAAA
SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSSS  LLL                     000000000       AAAAAAAAA
SSSSSSSSSSS  YYY         YYY    SSSSSSSSSSSS  LLL                     000000000       AAAAAAAAA
SSS          YYY         YYY    SSS           LLL                 000       000    AAA       AAA
SSS          YYY         YYY    SSS           LLL                 000       000    AAA       AAA
SSS             YYY   YYY       SSS           LLL                 000       000    AAA       AAA
SSS             YYY   YYY       SSS           LLL                 000       000    AAA       AAA
SSS             YYY   YYY       SSS           LLL                 000       000    AAA       AAA
   SSSSSSSS        YYY          SSSSSSSS      LLL                 000       000    AAAAAAAAAAAAAA
   SSSSSSSS        YYY          SSSSSSSS      LLL                 000       000    AAAAAAAAAAAAAA
   SSSSSSSS        YYY          SSSSSSSS      LLL                 000       000    AAA       AAA
          SSS      YYY                 SSS    LLL                 000       000    AAA       AAA
          SSS      YYY                 SSS    LLL                 000       000    AAA       AAA
          SSS      YYY                 SSS    LLL                 000       000    AAA       AAA
          SSS      YYY                 SSS    LLL                 000       000    AAA       AAA
          SSS      YYY                 SSS    LLL                 000       000    AAA       AAA
SSSSSSSSSSS        YYY          SSSSSSSSSSS   LLLLLLLLLLLLLL        000000000       AAA       AAA
SSSSSSSSSSS        YYY          SSSSSSSSSSS   LLLLLLLLLLLLLL        000000000       AAA       AAA
SSSSSSSSSSS        YYY          SSSSSSSSSSS   LLLLLLLLLLLLLL        000000000       AAA       AAA
```

FILEID**UTILKEY

```
UU      UU TTTTTTTTTT  IIIIII LL          KK      KK EEEEEEEEEE YY      YY
UU      UU TTTTTTTTTT  IIIIII LL          KK      KK EEEEEEEEEE YY      YY
UU      UU     TT         II  LL          KK      KK EE         YY      YY
UU      UU     TT         II  LL          KK      KK EE         YY      YY
UU      UU     TT         II  LL          KK    KK   EE            YY  YY
UU      UU     TT         II  LL          KK  KK     EE            YY  YY
UU      UU     TT         II  LL          KKKKK      EEEEEEEE        YY
UU      UU     TT         II  LL          KKKKK      EEEEEEEE        YY
UU      UU     TT         II  LL          KK  KK     EE              YY
UU      UU     TT         II  LL          KK    KK   EE              YY
UU      UU     TT         II  LL          KK      KK EE              YY
UUUUUUUUUU     TT      IIIIII LLLLLLLLLL  KK      KK EEEEEEEEEE      YY
UUUUUUUUUU     TT      IIIIII LLLLLLLLLL  KK      KK EEEEEEEEEE      YY


LL          IIIIII   SSSSSSSS
LL          IIIIII   SSSSSSSS
LL             II        SS
LL             II        SS
LL             II        SS
LL             II      SSSSSS
LL             II      SSSSSS
LL             II          SS
LL             II          SS
LL             II          SS
LL             II          SS
LLLLLLLLLL  IIIIII   SSSSSSSS
LLLLLLLLLL  IIIIII   SSSSSSSS
```

```
Symbo
------
GETBU
GETFL
GEXIT
GOFSE
GONSE
GRPTE
HLDFL
HOMSC
HTSI
HTSI
INDI
INIT
INPA
INPNO
INPNT
INPSA
IO$B
IO$C
IO$M
IO$M
IO$M
IO$M
IO$M
IO$V
IO$V
IO$V
IO$V
IO$_A
IO$-S
IO$-W
IOERF
IOERF
ITRCN
ITRS
KILF
LBRS
LBRS
LBRS
LBRS
LBRS
LCLSI
LIBS
LIBS
LIBS
LIBS
LIBS
LIBS
LIBS
LIBS
```

```
          1              .TITLE  UTIL$RANDOM_KEY
          2              .IDENT  /V04-000/
          3      ;*******************************************************************
          4      ;*                                                                 *
          5      ;*  COPYRIGHT (c) 1978, 1980, 1982, 1984 BY                        *
          6      ;*  DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS.         *
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         22      ;*                                                                 *
         23      ;*                                                                 *
         24      ;*******************************************************************
         25
         26      ;++
         27
         28      ; FACILITY:     Random number generator.
         29
         30      ; ABSTRACT:     Produces a random longword.
         31
         32      ; AUTHOR:       Paul R. Beck
         33
         34      ; DATE:         19-APR-1983    Last Edit:  19-APR-1983 21:37:26
         35
         36      ; REVISION HISTORY:
         37      ;
         38      ;
         39      ;--
```

_$25

Symb

LINP
LIST
LSCH
M
MOFS
MONS
MPDL
MRKF
N
NACC
NFLG
NMRB
NOCT
NOPR
NP
NWAT
NWID
OFLG
OSCA
OUPA
OUPN
OUPN
OUTB
OUTC
OUTD
OUTS
P
PATC
PATS
PCNT
PDL
PDLS
PDLS
POST
PREC
PREL
PRIN
PRIN
PRIN
PRTL
PST
PUTB
QARR
QBAS
QCMN
QFLG
QLCM
QLEN
QMAX
QNMB
QPNT
QRST

```
                                    0000    41 ;
                                    0000    42 ; Local data
                                    0000    43 ;
          FFFFFFFF FFFE7960         0000    44 TENMS:  .LONG   -100*1000,-1        ; 10 ms timer
                                    0008    45
                  0000000C          0008    46 KEY:    .BLKL   1                   ; build the key here
                  00000010          000C    47 DATA:   .BLKL   1                   ; Just increment this ad nauseum
                  00000014          0010    48 OFFSET: .BLKL   1                   ; Offset into KEY
                                    0014    49 ;++
                                    0014    50 ; UTIL$RANDOM_KEY
                                    0014    51 ;
                                    0014    52 ; FUNCTIONAL DESCRIPTION:
                                    0014    53 ;       Create a random, 32-bit key. This is done two bits at a time.
                                    0014    54 ; CALLING SEQUENCE:
                                    0014    55 ;       CALLS   #1,UTIL$RANDOM_KEY
                                    0014    56 ; INPUT PARAMETERS:
                                    0014    57 ;       None
                                    0014    58 ; OUTPUT PARAMETERS:
                                    0014    59 ;       P1      = address to receive key
                                    0014    60 ; COMPLETION CODES:
                                    0014    61 ;       SS$_NORMAL
                                    0014    62 ;--
                            0000    0014    63         .ENTRY  UTIL$RANDOM_KEY,^M<>
                                    0016    64
                   F3 AF     7C     0016    65         CLRQ    DATA                 ; set offset into key and counter
                                    0019    66         $SETIMR_S -
                                    0019    67                 daytim = TENMS -     ; 10 ms timer
                                    0019    68                 astadr = KEY_AST     ; address of timer AST
             19 50          E9      002D    69 10$:    BLBC    R0,20$               ; ?
             D9 AF          D6      0030    70         INCL    DATA                 ; *** LOOP ***
    FFFFFFFF 8F    DA AF    D1      0033    71         CMPL    OFFSET,#-1           ; done yet?
                   F3     12        003B    72         BNEQ    10$                  ; if NEQ, no.
       04 BC    C8 AF      D0      003D    73         MOVL    KEY,@4(AP)           ; return random key
       50  00000000'8F    D0      0042    74         MOVL    #SS$_NORMAL,R0       ; done
                          04      0049    75 20$:    RET
                                    004A    76
                                    004A    77 ; AST to collect the random key, two bits every 10 ms.
                                    004A    78 ; KEY contains address of the key being constructed
                                    004A    79 ; DATA contains the raw data (we just use the low two bits as random)
                                    004A    80 ; OFFSET contains the number of passes made *2 and offsets into the key.
                                    004A    81 ;
                            0000    004A    82         .ENTRY  KEY_AST,^M<>
                                    004C    83
          50    C1 AF      D0      004C    84         MOVL    OFFSET,R0
    B1 AF  02  50  B9 AF    F0      0050    85         INSV    DATA,R0,#2,KEY       ; move next two bits into key
             B6 AF          D6      0057    86         INCL    OFFSET               ; adjust offset
       02 B2 AF    20      F2      005A    87         AOBLSS  #32,OFFSET,10$       ; ...and exit when we're done
                   12     11      005F    88         BRB     20$
                                    0061    89 10$:    $SETIMR_S -
                                    0061    90                 daytim = TENMS -     ; 10 ms timer
                                    0061    91                 astadr = KEY_AST     ; address of timer AST
                          04      0072    92         RET
       95 AF   FFFFFFFF 8F  D0      0073    93 20$:    MOVL    #-1,OFFSET           ; set flag and don't reissue AST
                          04      007B    94         RET
                                    007C    95 .END
```

```
$$T1           = 00000000
DATA             0000000C R    01
KEY              00000008 R    01
KEY_AST          0000004A RG   01
OFFSET           00000010 R    01
SS$_NORMAL       ******** X    01
SYS$SETIMR       ******** GX   01
TENMS            00000000 R    01
UTIL$RANDOM_KEY  00000014 RG   01
```

+------------------+
! Psect synopsis !
+------------------+

PSECT name	Allocation	PSECT No.	Attributes										
. ABS .	00000000 (0.)	00 (0.)	NOPIC	USR	CON	ABS	LCL	NOSHR	NOEXE	NORD	NOWRT	NOVEC	BYTE
. BLANK .	0000007C (124.)	01 (1.)	NOPIC	USR	CON	REL	LCL	NOSHR	EXE	RD	WRT	NOVEC	BYTE

+----------------------------+
! Performance indicators !
+----------------------------+

Phase	Page faults	CPU Time	Elapsed Time
Initialization	35	00:00:00.04	00:00:01.44
Command processing	135	00:00:00.41	00:00:03.27
Pass 1	107	00:00:00.47	00:00:05.35
Symbol table sort	0	00:00:00.00	00:00:00.00
Pass 2	34	00:00:00.16	00:00:02.76
Symbol table output	2	00:00:00.02	00:00:00.01
Psect synopsis output	2	00:00:00.01	00:00:00.01
Cross-reference output	0	00:00:00.00	00:00:00.00
Assembler run totals	318	00:00:01.11	00:00:12.86

The working set limit was 1050 pages.
2146 bytes (5 pages) of virtual memory were used to buffer the intermediate code.
There were 10 pages of symbol table space allocated to hold 9 non-local and 4 local symbols.
95 source lines were read in Pass 1, producing 16 object records in Pass 2.
4 pages of virtual memory were used to define 4 macros.

+------------------------------+
! Macro library statistics !
+------------------------------+

Macro library name	Macros defined
_255DUA28:[SYS.OBJ]LIB.MLB;1	0
_255DUA28:[SYSLIB]STARLET.MLB;2	4
TOTALS (all libraries)	4

41 GETS were required to define 4 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS$:UTILKEY/OBJ=OBJ$:UTILKEY MSRC$:UTILKEY/UPDATE=(ENH$:UTILKEY)+EXECML$/LIB

UTILKEY
LIS

TECOLBR
LIS

TECOCMD
LIS

SCSLOA
LIS

TECO

TECO
MAP

UTILKEY
LIS

TECOLBR
LIS

TECONAT
LIS

TECOCMD